2021 Annual Report

Candidate Conservation Agreements:
Texas Hornshell Mussel (*Popenaias popeii*)

CEHMM
Conservation & Environmental Services
505 North Main Street | Carlsbad, New Mexico 88220-5875
phone: (575)885-3700 | email: info@cehmm.org

This page intentionally left
blank.

Contents

SUMMARY

The Center of Excellence (CEHMM) and the New Mexico State Land Office (SLO) administer sister Candidate Conservation Agreements for the Texas hornshell mussel (hornshell or THM) and other covered species. CEHMM administers a Candidate Conservation Agreement (CCA) for federal land and a Candidate Conservation Agreement with Assurances (CCAA) for non-federal and non-state lands. The State Land Office administers a CCAA for state trust lands. The conservation agreements are very similar, and are referred to collectively as the CCA/As. To the extent practicable, CEHMM and SLO jointly implement the CCA/As. This annual report describes the conservation activities and accomplishments for the CCA/As in 2021.

There are 102 Participants enrolled in the CCA/As through Certificates of Inclusion (CI) or Certificates of Participation (CP). Fifty Participants are enrolled in multiple conservation agreements. To date, Participants have enrolled a total of 401,630.34 acres in the CCA/As.

In 2021, Participants contributed $350,461.43 to support program administration, species research, and conservation work through the CCA/As, bringing the total revenue contributed by CCA/A Participants over the duration of the agreements to $4,444,895.04. All of the funding contributed during 2021 came exclusively from industry Habitat Conservation Fees. The Habitat Conservation Fees came from 356.60 acres of new surface disturbance on federal land, non-federal, and non-state lands, and 115.07 acres on state trust land, with a combined total new surface disturbance in 2021 of 472 acres.

CEHMM's total expenditures for the program's administration, implementation, and staffing needs were $292,838.41 in 2021 and $1,124,795.05 over the life of the agreements. SLO's costs for administering its CCAA are absorbed by the agency.

During 2021, the joint Executive Committee allocated $82,614.00 of the CCA/A funds to go toward ongoing research to determine flow regime requirements for the species and $50,000.00 toward habitat projects. Additionally, $75,000.00 of unexpended funds was carried over from 2020. Including funds carried over from 2020, the total allocation for research and habitat projects was $207,614.00. An additional $250,000.00 was set aside as matching funds for a National Fish and Wildlife Foundation grant. The grant was awarded to the CCA/A program in 2021 to develop a pilot market-based instream flow program to benefit the covered species.

CEHMM continued to monitor the flows of the Delaware and Black rivers, which both had periods of low flow in 2021. Along with the New Mexico Department of Game and Fish (NMDGF) and Miami University of Ohio, CEHMM also assisted with species monitoring surveys.

During the 2021 calendar year, the Implementation Committee held four conference calls to discuss project priorities, grant opportunities, projects, and emergency response actions for the hornshell. The Stakeholder Committee held one meeting to discuss the CCA/A projects, funding, conservation measures, and recommendations regarding the annual report. The Executive Committee met or held conference calls six times in 2021 to discuss funding levels, to determine which proposed projects to fund, and to discuss program priorities.

I. INTRODUCTION

This joint report to the United States Fish and Wildlife Service ("Service") describes the activities conducted in 2021 under the three sister Candidate Conservation Agreements for the THM and other covered species. CEHMM administers a CCA for federal land and a CCAA for non-federal and non-state (i.e., private) lands. SLO administers a CCAA for state trust lands. The three conservation agreements are referred to collectively herein as the "CCA/As." To the extent practicable, CEHMM and SLO jointly implement the CCA/As through a common governance structure. Figure 1 shows the CCA/A boundary, CCA/A management zones, and land ownership. Additional details about the CCA/As are available in the 2018 annual report and in the agreements themselves, which can be accessed at:

https://www.cehmm.org/index.php/conservation/texas-hornshell-program/texas-hornshell-documentation

https://www.fws.gov/southwest/es/documents/R2ES/TxHornshell_CCAA_NMCPL_v3_FR2980.pdf.

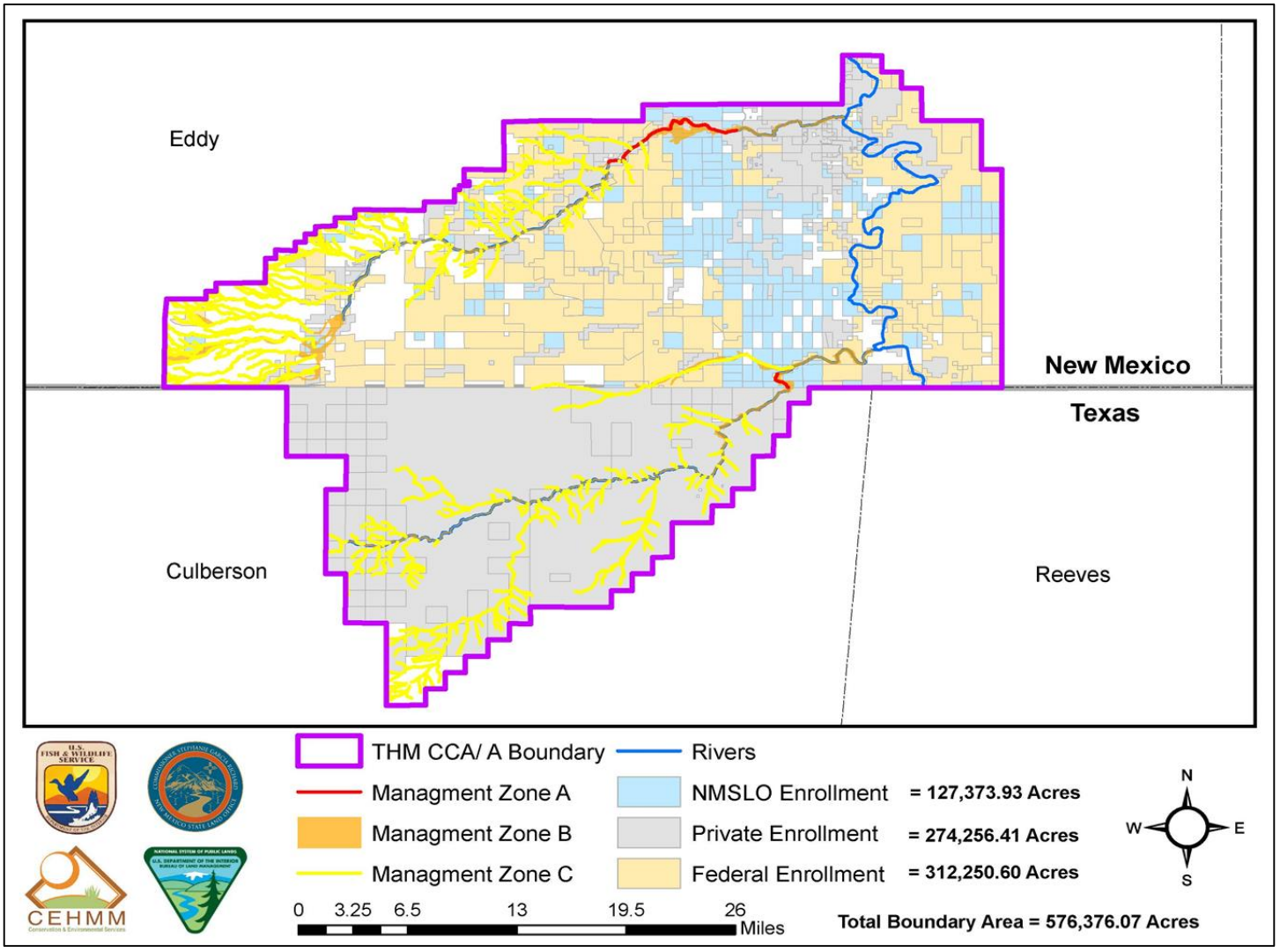


Figure 1. CCA/A Boundary, CCA/A Management Zones, and Land Ownership.

II. 2021 ENROLLMENT, PARTICIPANT CONTRIBUTIONS, AND FUNDING ALLOCATIONS

CEHMM and SLO have issued a combined total of 103 CIs in the CCAAs for non-federal land or CPs for the CCA for federal land. Fifty Participants are enrolled in multiple Candidate Conservation Agreements.

CCA/A Participant and parcel acreage enrollment data for 2021 is shown in Table 1. SLO administered 28 CIs and CEHMM administered 42 CIs and 33 CPs. SLO had 127,373.93 acres of state trust land enrolled in its CCAA in 2021. CEHMM had 274,256.41 acres of non-federal, non-state land enrolled in its CCAA and 312,250.60 acres of federal land enrolled in its CCA. Fifty Participants are enrolled in multiple Candidate Conservation Agreements because they have a combination of land ownership types. The total amount of land enrolled in the CCA/As in 2021 was 401,630.34 acres, which has remained relatively consistent throughout the four reporting years of the conservation agreements (Figure 2). Annual acreage can vary due to the Participants that opted for "All Activities Enrollment" can add or remove enrolled acreage based on their current areas of activity. The same acres can also be enrolled more than once by different Participants that are using the land for different activities; the totals therefore reflect multiple enrollments of the same parcels.

Table 1. CCA/A Enrollment in 2021.

	No. CIs	No. CPs	Acres Enrolled in CCA	Acres Enrolled in CCAA
CEHMM	42	33	312,250.60	274,256.41
SLO	28	N/A	N/A	127,373.93
TOTAL:	**70**	**33**	**312,250.60**	**401,630.34**

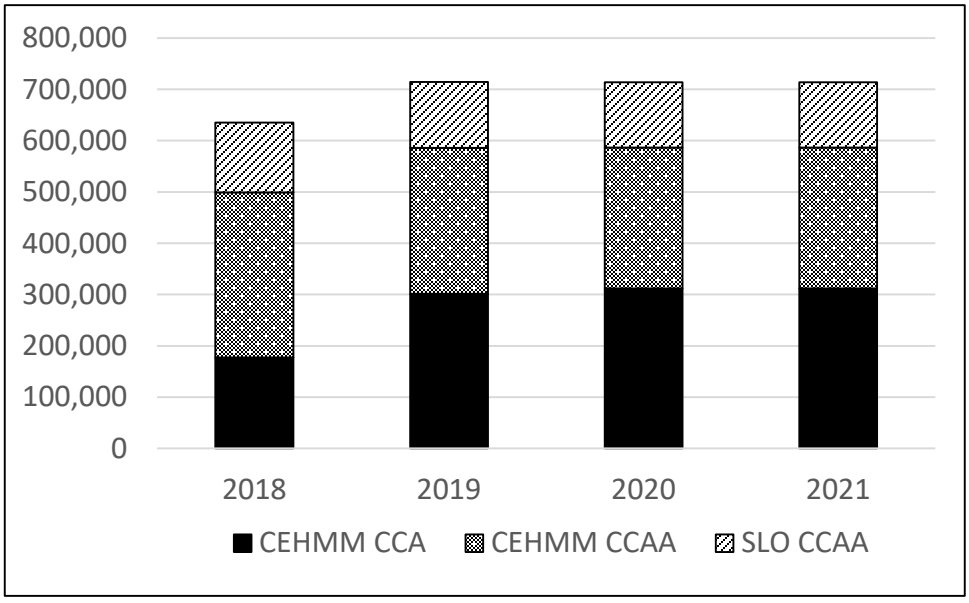


Figure 2. Acres Enrolled in Candidate Conservation Agreements from 2018 to 2021.

In 2021, Participants contributed $350,461.43 through Habitat Conservation Fees to support program administration, species research, and conservation work through the CCA/As, bringing the total contributions by CCA/A Participants to $4,444,895.04 over the duration of the agreements. Annual contributions were higher in 2018, and 2019 due to Enrollment Fee payments in the first two years of the CCA/As (Figure 3) (Appendix A). All of the funding contributed during 2021 came exclusively from industry Habitat Conservation Fees generated from 357 acres of new surface disturbance on federal land, non-federal, and non-state lands, and 115.07 acres on state trust land, with a combined total new surface disturbance in 2021 of 472 acres.

Funding Expenditures and Allocations

From the total funds contributed to the SLO CCAA in 2021, $10,762.98 was used for CEHMM's administrative overhead. CEHMM's total expenditures for the program's administration, implementation, and staffing needs were $292,838.41 in 2021 and $940,469.76 over the life of the agreements. SLO's costs for administering its CCAA are absorbed by the agency.

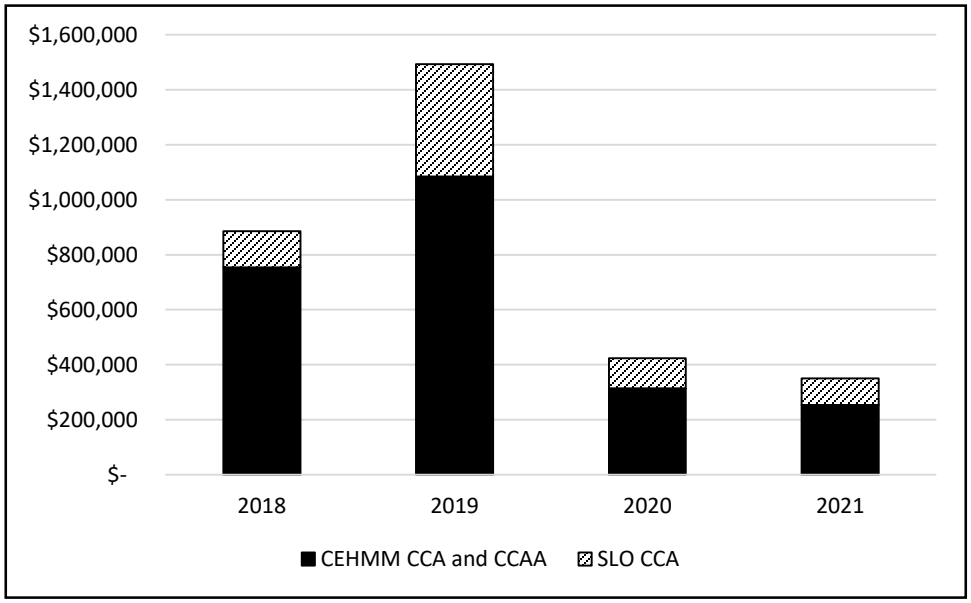


Figure 3. Participant Contributions to CCA/A Program from 2018 to 2021.

In 2021, the joint Executive Committee made the following budget allocations:

- $50,000.00 in new funding for habitat projects
- $75,000.00 carried over from unused funds from 2020
- $77,005.00 for stream gage maintenance
- $82,614.00 to research in to the flow requirements for the THM and other covered species
- $250,000.00 set aside as matching funds for a National Fish and Wildlife Foundation grant that was awarded to the CCA/A program to develop a pilot, market-based instream flow program for the Black River.

III. 2021 COMMITTEE ACTIVITIES

CCA/A Coordinating Committee (CCAACC)

The CCAACC is an informal committee that was formed by CEHMM and SLO pursuant to the terms of their Memorandum of Agreement, to provide a mechanism for coordinating joint administration of the CCA/As. The CCAACC did not meet during 2021, but members communicated over email and via an online survey regarding members' views about the development of an instream flow protection program.

Joint Executive Committee

The joint Executive Committee held six joint conference calls in 2021 to determine project funding priorities and allocations. The Executive Committee members in 2021 were as follows:

CEHMM CCAA: Chuck Hayes (Service) and Emily Wirth (CEHMM)

CEHMM CCA: Chuck Hayes, Emily Wirth, and Ty Allen (BLM)

SLO CCAA: Chuck Hayes and Lisa Henne (SLO)

Implementation Committee members Vicky Ryan (Service), Sarah Yates (Service), Matt Ramey (CEHMM), and Elaine Heltman (SLO) also attended Executive Committee meetings to exchange information about funding allocations, project recommendations, and other matters.

The Executive Committee discussed the following items at their meetings:

- Program budget and expenditures.
- Program priorities and funding allocations for projects and research.
- Strategic planning to better prioritize use of funding.
- New project ideas and research gaps.
- A request from the flow requirement researchers from Miami University, Texas A&M, and Auburn University for additional time and funding to complete their projects, which have experienced interruptions and delays due to COVID.
- The flow requirement researcher's reluctance to adopt a revised temporary minimum flow target. Their hesitations are due to lack of sufficient data and concern that the target measurement would be used inappropriately and thus not contribute to recovery of the species.
- National Fish and Wildlife Foundation (NFWF) grant which was awarded to develop a pilot instream flow program.
- Convening a technical working group to develop the instream flow pilot program.
- Contract assistance with coordinating the instream flow program technical working group.

The joint Executive Committee made the following decisions in 2021:

1. The interim minimum flow requirement will remain in place, but the CCA/A program will continue to seek input from the researchers conducting flow regime requirement studies on other parameters besides flow, such as water quality or habitat, that should be monitored to protect the species.
2. CEHMM will issue a contract to AMP Insights to facilitate the Instream Flow Technical Working Group and assist with development of the pilot instream flow program.
3. The proposed roster for the Instream Flow Technical Working Group includes representatives from

CEHMM, SLO, the Bureau of Land Management (BLM), the Service, NMDGF, New Mexico Interstate Stream Commission (ISC), New Mexico Office of the State Engineer (OSE), and organizations with experience in developing instream flow programs, including New Mexico chapters of The Nature Conservancy, Trout Unlimited, and Audubon. Researchers from Auburn University, Miami University, and Texas A&M who are conducting flow requirement studies will be consulted for scientific input as needed.

4. The CCA/A program will set aside funds each year for instream flow programs.
5. The 2021 habitat project funding allocations are as follows:
    - $50,000.00 was allocated for habitat projects, which would be added to a $75,000.00 rollover from 2020, for a total of $125,000.00 available in 2021 for habitat projects.
    - $250,000.00 was allocated as matching funds for the NFWF instream flow pilot project.
6. $77,005 would be allocated for stream gage maintenance.
7. Due to the extenuating circumstances of the COVID pandemic, the Executive Committee agreed to extend the timeline for the flow requirements studies and to increase funding for the projects. The Committee agreed to fund the remaining three years of the project for all three universities as follows, for a total funding allocation of $82,614.00 for 2021.
    - Miami University: Year 2 funding of $21,486.00, Year 3 funding of $19,031.00, and Year 4 funding of $24,125.00.
    - Auburn University: Year 2 funding of $25,659.00, Year 3 funding of $23,867.00 and Year 4 funding of $15,484.00.
    - Texas A&M: Year 2 funding of $35,469.00, Year 3 funding of $29,691.00 and Year 4 funding of $54,308.00.
    - For all universities, Year 3 and Year 4 funding is contingent on the success of Year 2 and approval of deliverables and funding by CEHMM and the CCA/A Executive Committee.

Stakeholder Committee

The Stakeholder Committee included the following representatives in 2021:

Agriculture and Ranching: Alisa Ogden and Nathan Jurva
Oil and Gas: Kegan Boyer (Chevron), Veronica Rapp (Oxy), and Greg Boans (Murchison)
Midstream: No representative
Carlsbad Irrigation District: Coley Burgess
Water Withdrawers: Jim Davis (Landowner) and Dave Anderson (Select)
Eddy County: No representative
Interstate Stream Commission: Frank Scott
SLO: Camilla Romero (non-voting, support)
CEHMM: Matt Ramey (non-voting, support)

The Stakeholder Committee discussed the following items at their meetings:

- Habitat Conservation Plan
- CCA/A projects
- Funding
- Committee operating procedures

- Discussion and review

Implementation Committee

The Implementation Committee held four joint conference calls in 2021 to determine project priorities, project review, CCA/A updates, and HCP. The Implementation Committee members in 2021 were as follows:

Service: Sarah Yates
BLM: Cassie Brooks
CEHMM: Matthew Ramey
SLO: Elaine Heltman (alternates Camilla Romero and Kyle Rose)
NMDGF: Daniel Trujillo (alternate Joanna Hatt)

The Implementation Committee met and discussed the following topics:

- CCA/A project priority review and update
- Black and Delaware river status
- Habitat Conservation Plan
- Project/grant review and funding
- Landscape monitoring

Implementation Committee activities in 2021 include:

1. Providing ranking for projects, research, and grants, as follows:
   - River flow regime requirements study for THM.
   - Instream flow.
   - Research on hydrology of Black and Delaware rivers, and long term captivity requirements.
   - Education and outreach for THM and other covered species.
   - Restoration needs for Delaware River and threats to covered species.
   - Landscape monitoring for both river systems and mitigation of impact to habitat.
2. The Implementation Committee reviewed three project proposals and two grants in 2021. The two research projects did not receive funding and the two grant proposals have been submitted to the NFWF, although neither has been funded as of yet. A NFWF funding decision is expected in March of 2022.
3. Provided quarterly updates of the status of the flows for both the Black and Delaware River. Updates incorporated hydrographs of all United States Geological Survey (USGS) gages, flows in relation the 9.3cfs set by the CCA/A's, and bi-weekly monitoring photos of monitoring sites on both rivers.
4. Provided progress updates on the status of the Habitat Conservation Plan development and design.
5. Updated the Implementation committee of activities taking place on the landscape such as spills, contaminated areas, fires, and flows to aid in the protection of the THM and other covered species.

Participant Meeting

CEHMM held a Participant meeting for the hornshell program on July 29, 2021 and discussed the following:

- Program overview of THM CCA/A
- Current projects
- Current research
- Partnership presentation
- Future goals for the CCA/A program
- Habitat conservation plan development

Technical Working Group

No technical working groups were convened in 2021.

IV. OUTREACH

In February, CEHMM staff attended a virtual riparian restoration conference held by Riversedge West. The meeting was a national gathering of scientists, land managers, government agencies, non-government organizations, and private landowners to network and discuss current riparian restoration research and methods. CEHMM staff will use the information gathered at this conference to make more informed decisions on research, monitoring, and habitat improvement projects of the riparian lands within the THM CCA/A boundary.

In March, CEHMM staff participated in a virtual career fair for Alamogordo Public Schools. The team created a 10-minute video discussing, among other items, the conservation efforts of the THM program. CEHMM shared the footage with approximately 1,500 students in the Alamogordo Public School system.

In March, CEHMM staff assisted the BLM and Plains Pipeline in planting sapling cottonwood trees along the Black River at the Cottonwood Day Use Area (Figure 4). Over fifty new trees were planted and fenced off for protection from wildlife. The trees will provide shade and stabilize the soils for years to come.

Figure 4. Tree Planting at BLM Cottonwood Day Use Area

During 2021, CEHMM also attended several educational talks, hosted by the Service, regarding the conservation of freshwater mussels. CEHMM utilizes the information gathered at these educational talks to make more informed management decisions regarding the Texas hornshell.

In May, CEHMM staff participated in Riverblitz, an annual river cleanup event in the city of Carlsbad and Eddy County. CEHMM encouraged enrollees along the Black River to join as well. Within a few hours, CEHMM staff removed hundreds of pounds of litter from the banks of the Black River. CEHMM participates in Riverblitz twice a year; contact us if you or your organization would like to join us in the Black River cleanup efforts.

In July, CEHMM hosted its third annual Participant Meeting. During the meeting, stakeholders were given an update on the CCA/A program. CEHMM also conducted presentations regarding ongoing funded projects. A THM critical habitat designation update was presented, and threats and concerns for the THM were also discussed.

V. SPECIES MONITORING

CEHMM assisted the NMDGF in their annual fish population survey along the Black River. Fish populations were surveyed using numerous sampling methods, including trammel nets and electroshocking. The fish that were caught were weighed, measured, and then released back into the river. Potential THM host fish were inspected for glochidia before being released.

CEHMM also assisted Miami University (Ohio) and the NMDGF with Pecos springsnail surveys along the Black River during 2021. These surveys primarily consisted of collecting substrate samples and identifying and counting the total number of springsnail within the sample.

CEHMM staff also assisted the NMDGF and Miami University in the data collection of THM population studies on the Black River. THMs were surveyed using tactile methods and snorkeling gear. Mussels were counted, measured, and tagged for population data collection.

Figure 5. CEHMM staff with a flathead catfish that was sampled in the Black River.

Black River Monitoring

The CCA/A set a temporary minimum flow goal of 9.3 cubic feet per second (cfs) at the Malaga gage on the Black River. This is pending the development of a revised flow requirement for the hornshell by August 2022. Since the CCAA took effect in 2017, CEHMM has monitored the daily average flow at existing USGS flow gages in the Black River at Malaga (USGS 08405500[1]) and Blue Springs (USGS 08405450[2]) (Figure 6). CEHMM staff set alarms on the flow gages; when river flows are below 9.3 cfs, they are notified and can monitor the river more closely. Participants in the CCA/A who withdraw water from or near the Black River are also notified so they can implement any pumping curtailment conservation measures contained in their CIs/CPs.

CEHMM's river flow monitoring has also been vital for alerting program staff when additional measures, such as salvage efforts, might be necessary to prevent THM mortality due to low flows. Hornshell require perennially wetted habitat and flowing water, and emersion (stranding) can cause death and dehydration (Coker 1919). Observational data suggest that hornshell beds may be exposed when flows drop below ~3.0 cfs, so if flows are decreasing and nearing 3.0 cfs, CEHMM notifies the Service and NMDGF so they can take appropriate measures to protect the species.

Early in the program's implementation, the CCA/A program partners agreed the two existing gages did not provide sufficient information about flows within the occupied reach, and they determined that installation of additional gages should be a priority. In 2019, CEHMM, SLO, and the Service committed to share the costs of installing and paying for the ongoing annual maintenance of two new USGS gages in the Black River. The Technical Working Group and USGS collaborated to select the best locations for the new gages and opted to install one new gage at Harkey Crossing (USGS 08405400[3]) and the second gage below Blue Springs (USGS 08405350[4]) (Figure 6). The gage at Harkey Crossing also collects water quality parameters within the occupied reach, including temperature, dissolved oxygen, conductivity, and salinity. The addition of the two new gages

[1] https://waterdata.usgs.gov/nm/nwis/uv?site_no=08405500
[2] https://waterdata.usgs.gov/nm/nwis/uv/?site_no=08405450
[3] https://waterdata.usgs.gov/nm/nwis/uv/?site_no=08405400
[4] https://waterdata.usgs.gov/nm/nwis/uv/?site_no=08405350

allows the CCA/A program to develop a more comprehensive data set to monitor flows and understand how flow varies from upstream to downstream in the river and how water quality varies with stream discharge. The gages also help with calculations of the volume of water that would be needed, as well as approximately when it would be needed each year, to reduce threats to the species.

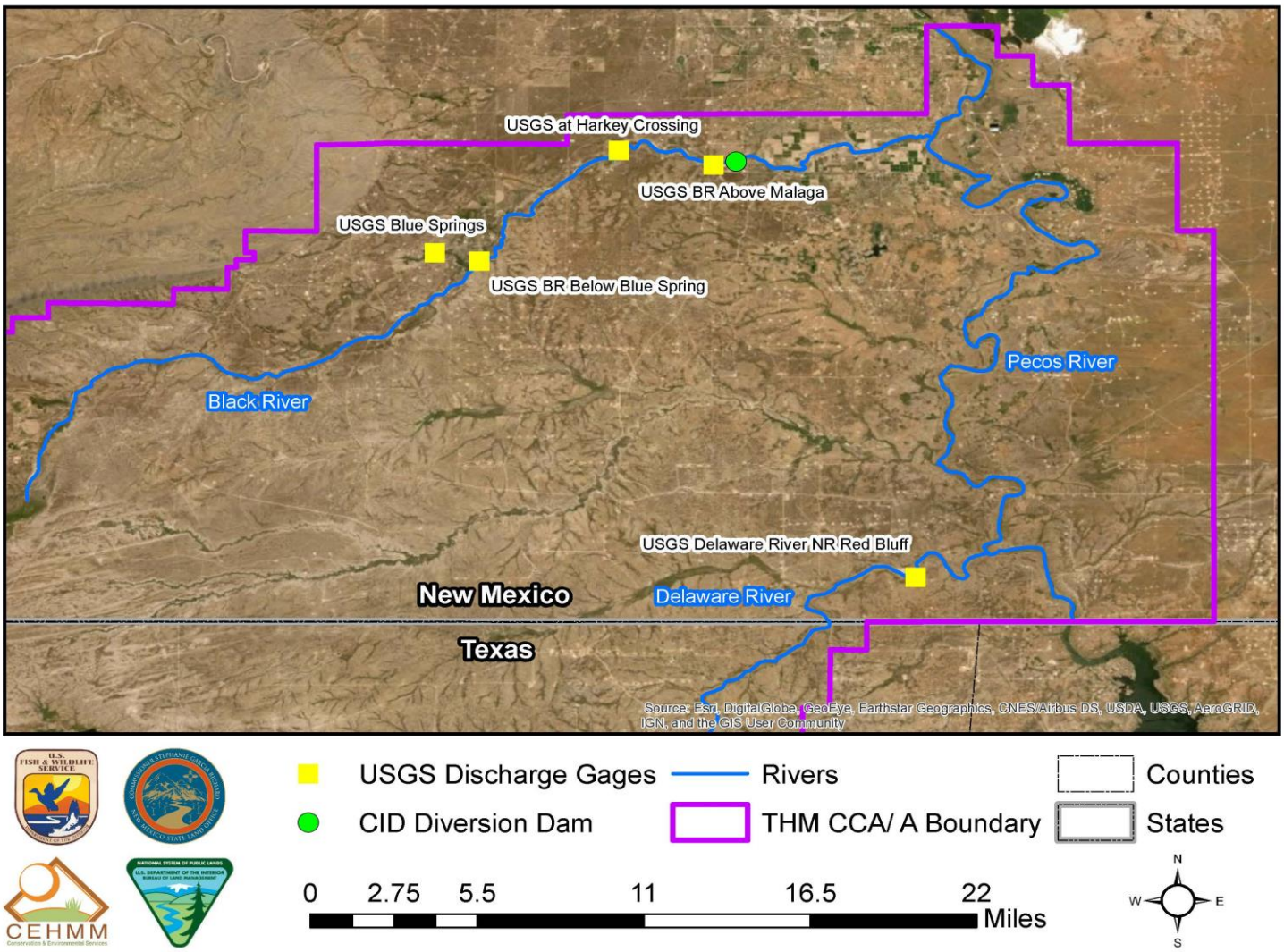


Figure 6. Map of USGS Stream Gage Locations Used by the CCA/A Program.

During 2021, the rolling mean daily discharge (volume of flow) in the Black River at the Malaga gage was below the interim minimum flow threshold of 9.3 cfs for most of the year except for brief periods in the summer months and a longer period in the fall (Figures 7.A and 7.C). Flows also dropped below 3.2 cfs in April, July, August, September, and October (Figure 7.B). CEHMM also monitors and records the provisional instantaneous USGS gage readings and calculates monthly average, maximum, and minimum flow data (Table 2). The volume of water that would have been required to maintain the CCAA's interim minimum flow target of 9.3 cfs ranged from approximately 16 to 333 acre-feet per month, for a total of 1664 acre-feet for 2021 (Figures 7.D and 8.C).

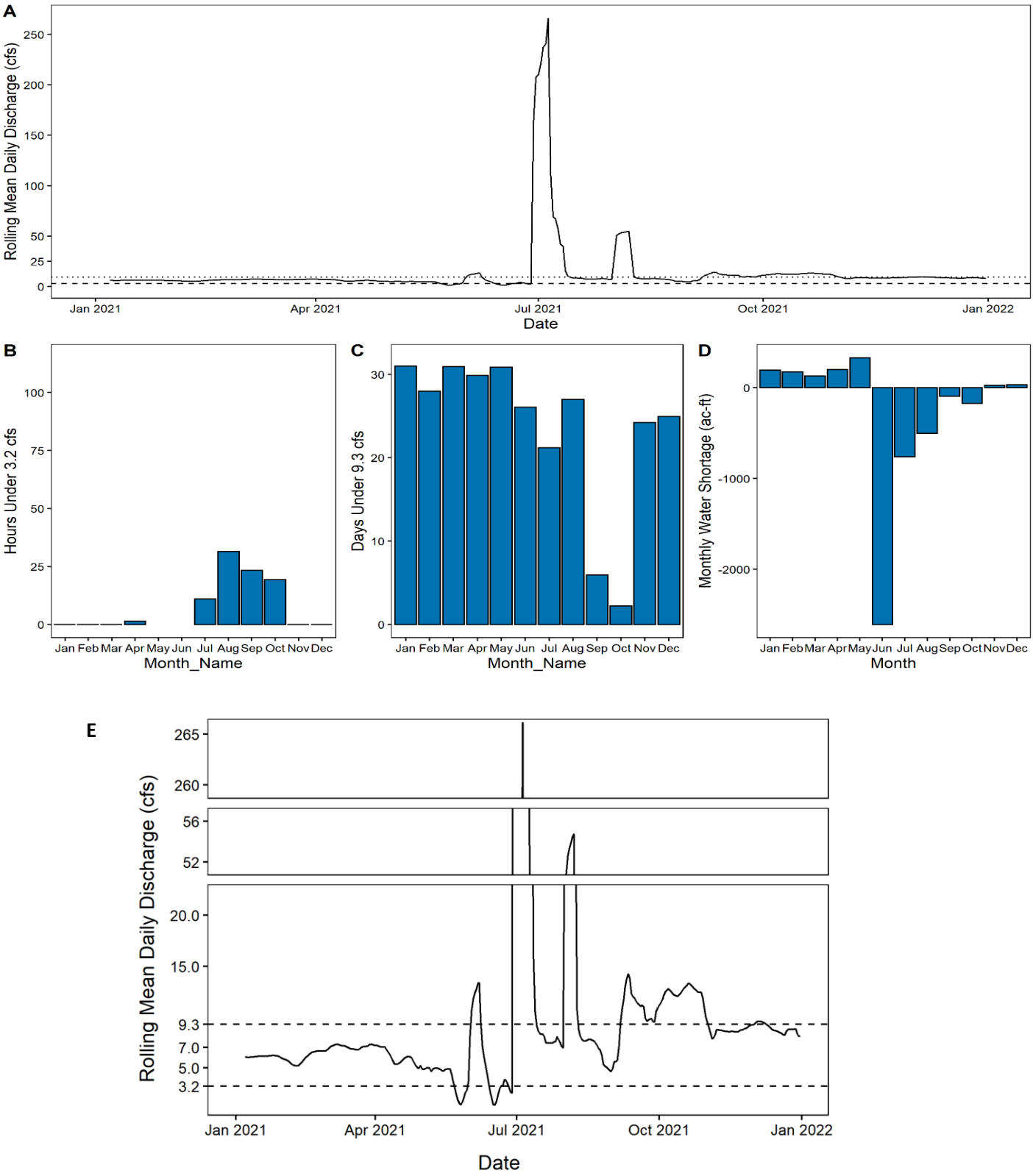


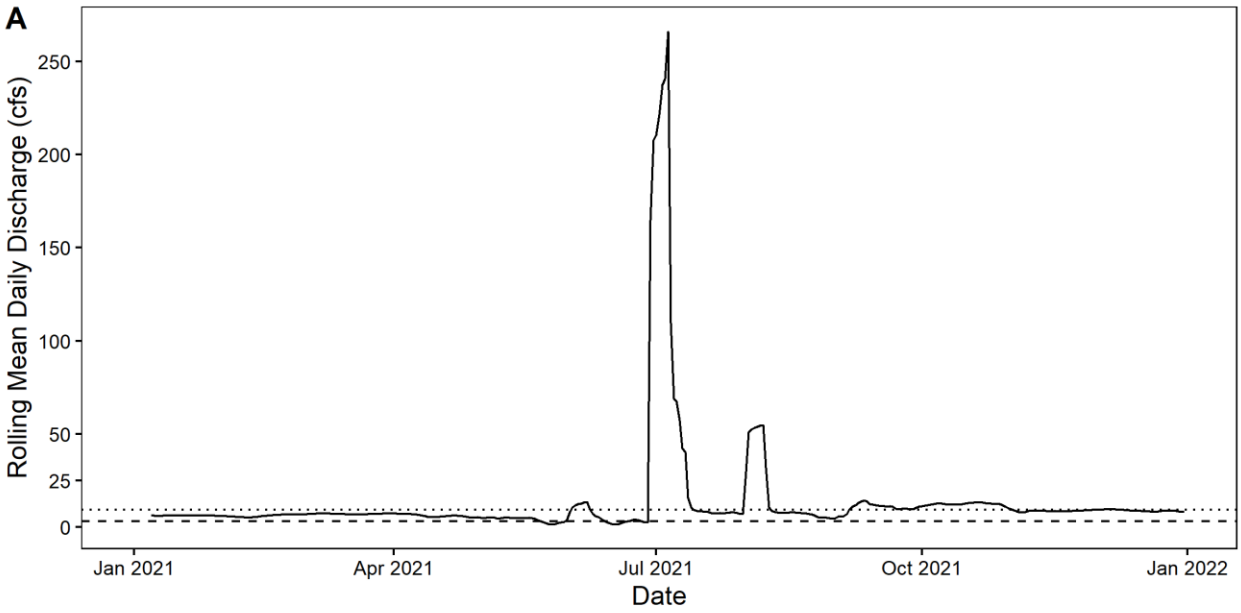
Figure 7. Rolling 7-day average daily discharge (cfs) for the Black River Above Malaga gage (USGS 08405500) from January 1 to December 31, 2021 using daily average data (A and E; breaks in the y-axis are included to show the peaks for events where discharge rose high outside the normal range). Cumulative hours where discharge was under 3.2 cfs (B) and 9.3 cfs (C) are also presented, where calculated time under a threshold was performed using 15-minute gage data. Using daily average data, monthly water shortage (in acre-ft) to maintain 9.3 cfs has also been calculated and presented. All data points (except 1/1/2021 through 1/5/2021, which are approved data) are provisional USGS data and can be revised until receiving final approval.

Table 2. Monthly Average, Minimum Daily Average, and Maximum Stream Flow Calculated by CEHMM using USGS Instantaneous Provisional Stream Gage Readings.

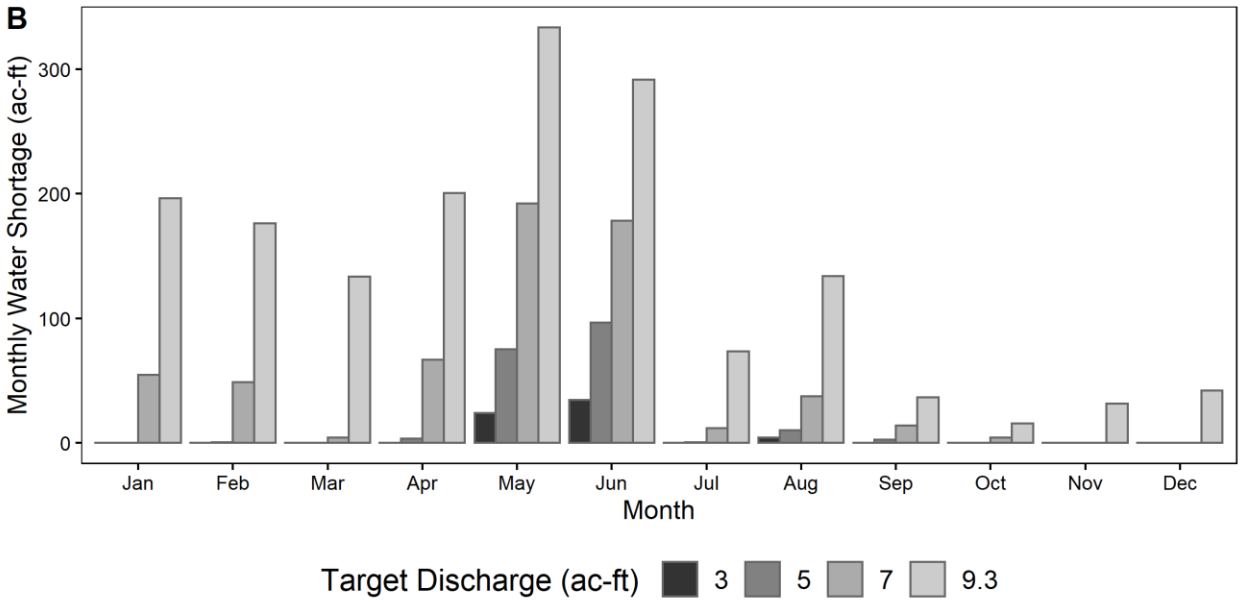
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Black River (USGS 08405500 BR Above Malaga)												
Average Flow	8.33	8.19	8.32	7.74	7.43	6.66	5.52	5.03	3.64	3.87	3.70	6.52
Minimum Daily Average	**7.85**	**7.15**	**7.01**	**7.21**	**6.59**	**5.95**	**4.22**	**1.82**	**1.13**	**0.05**	**0.00**	**5.61**
Maximum Daily Average	8.70	8.97	12.4	8.25	8.07	7.42	6.28	6.93	4.61	5.63	5.67	7.30
Blue Springs (USGS 08405450 Blue Springs Above Diversions)												
Average Flow	10.9	--	--	8.11	9.48	14.03	9.03	7.93	7.23	7.87	6.93	11.13
Minimum Daily Average	**8.56**	**--**	**--**	**6.00**	**7.63**	**10.10**	**7.74**	**4.59**	**5.51**	**4.41**	**4.05**	**9.69**
Maximum Daily Average	13.3	--	--	10.20	10.10	19.60	9.59	9.23	7.79	9.39	9.78	12.9

The volume of water that would have been needed to maintain river flows at 3, 5, 7, and 9.3 cfs in 2021 is shown in (Figure 8). Approximately 59 acre-feet of water would have been needed from May through June, and approximately 4 acre-feet in August, to maintain flows at or above 3 cfs at all times in 2021. To maintain flows at or above 5 cfs, approximately 190 acre-feet of water would have been needed during the May-August time period. Over 600 acre-feet of water would have been needed during the January through October time period, to maintain flows at or above 7 cfs at all times. Maintaining flows at or above 9.3 cfs at all times would have required 1665 acre-feet of water to be made available over the entire year, with the bulk of the water needed from January to August. These examples are provided to show the range of volumes of water that the Instream Flow Program Technical Working Group considers when developing strategies for ensuring sufficient instream flow, such as purchase or lease of water rights or water use agreements. As more information becomes available about the flow regime requirements for the species and the likely deficits, the volume and timing of water needed for an instream flow program can be refined.

A



B



C

Month	Shortage (ac-ft) 3 cfs	Shortage (ac-ft) 5 cfs	Shortage (ac-ft) 7 cfs	Shortage (ac-ft) 9.3 cfs
Jan	0.000000	0.0000000	54.783471	196.20496
Feb	0.000000	0.5157025	48.674380	176.40992
Mar	0.000000	0.0000000	4.204959	133.44793
Apr	0.000000	3.3520661	67.001653	200.70744
May	24.218182	75.3123967	191.980165	333.40165
Jun	34.472727	96.5355372	178.373554	291.37190
Jul	0.000000	0.4165289	11.920661	73.36860
Aug	4.224793	10.0363636	37.328926	133.82479
Sep	0.000000	2.4991736	13.864463	36.45620
Oct	0.000000	0.0000000	4.542149	15.59008
Nov	0.000000	0.0000000	0.000000	31.75537
Dec	0.000000	0.0000000	0.000000	41.91074
Total	62.915702	188.6677686	612.674380	1664.44959

Figure 8. Rolling 7-day average daily discharge (cfs) for January 1 to December 31, 2021 for the Black River Above Malaga gage (USGS 08405500). (A). Using daily data, monthly water shortage (in ac-ft) to maintain 3, 5, 7, and 9.3 cfs has also been calculated and presented in both figure (B) and table (C) format. All data points (except 1/1/2021 through 1/5/2021, which are approved data) are provisional USGS data and can be revised until receiving final approval.

Delaware River Monitoring

In 2019, the Delaware River stopped flowing for 138 days and again for 240 days in 2020. The lack of flow in past years, prompted CEHMM to start monitoring the flows of the Delaware River on a routine basis. CEHMM has utilized a USGS gage (USGS 08408500) and visual inspections to monitor the conditions on the Delaware River. The USGS gage data was not reliable for 2021 due to the diversion of water around the gage during bridge construction and channel modification. If the cross section of the channel where the gage is installed is altered, the relationship between gage height and flow volume is no longer valid and must be re-established. Also, the staff gage that CEHMM installed in 2020 was carried downstream during a flood event in June. The lack of operating gages precludes any quantitative representation of the Delaware for 2021. CEHMM personnel, however, conducted weekly site visits in 2021 and took photographs to visually document flow. For this report, we selected a representative photo from each month to show typical flow conditions for that month. As seen in (Figures 9 & 10), flows in the Delaware were substantially higher in 2021 compared to recent years, when the Delaware frequently had little to no flow (see 2019 and 2020 annual reports). Flood events occurred on the Delaware River in June, July, and August, 2021, but CEHMM personnel were not able to access the photo point due to inundation of the site.

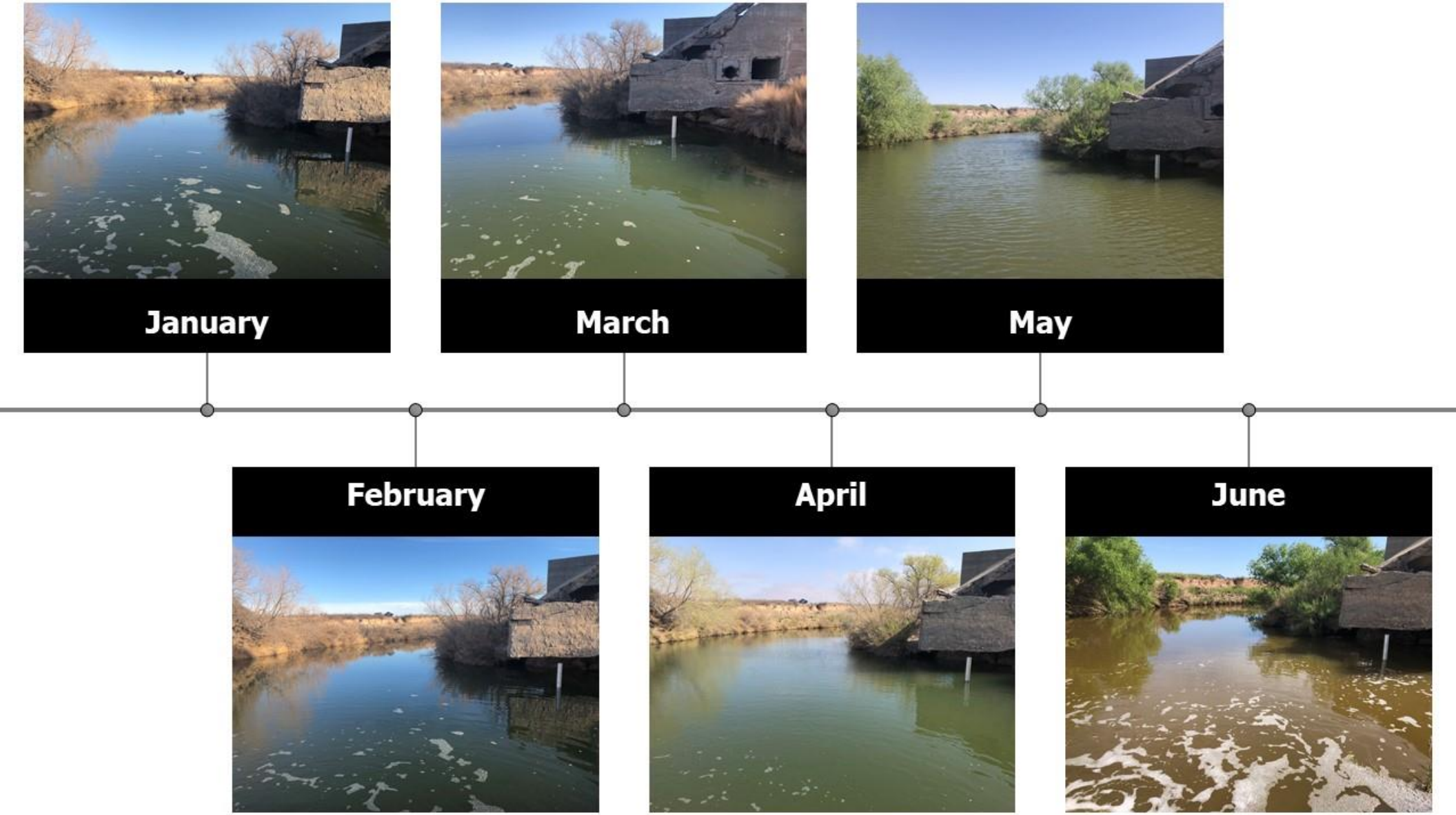


Figure 9. A photographic time of the Delaware River from January to June 2021.

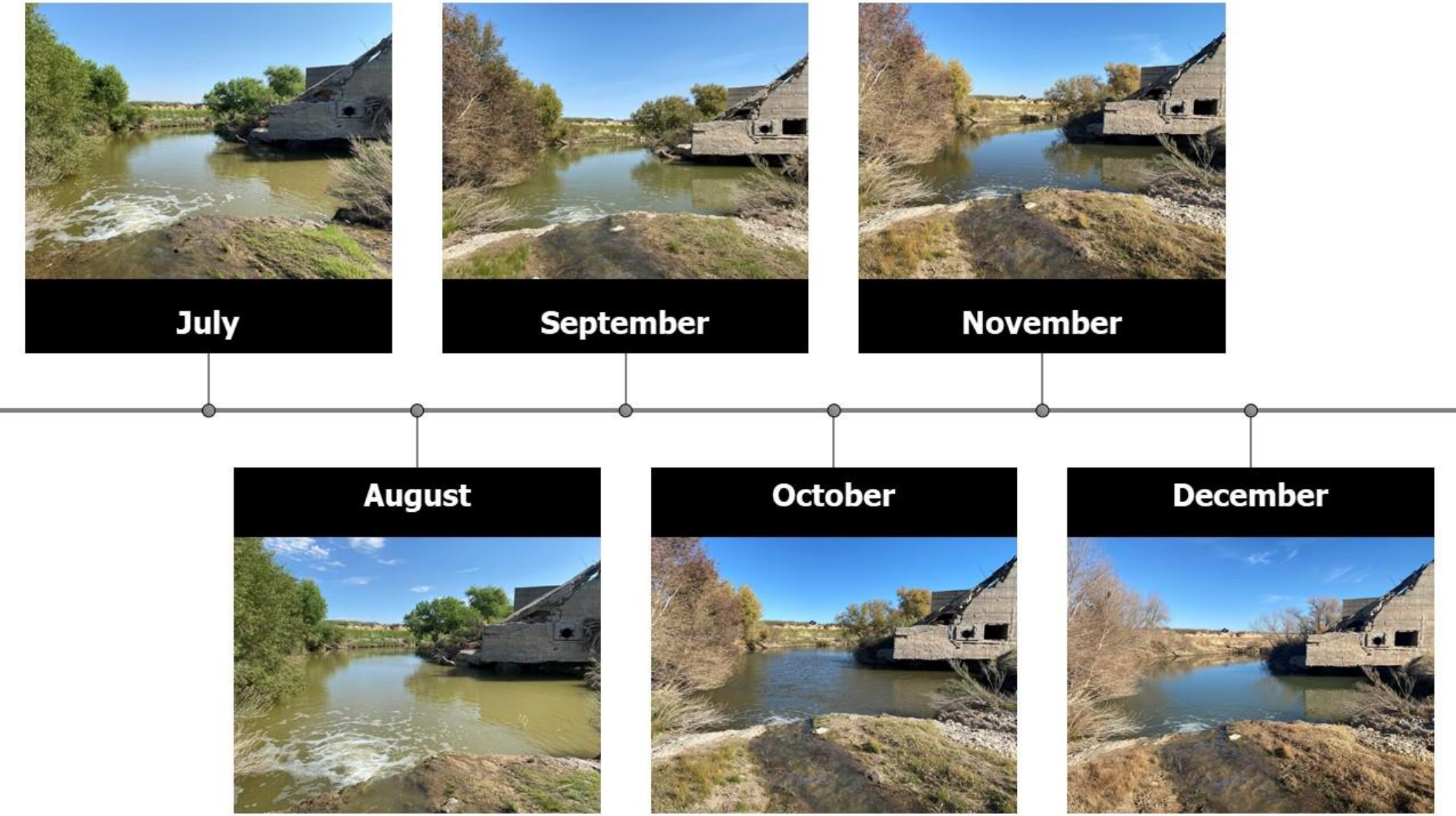


Figure 10. A photographic time of the Delaware River from July to December 2021.

VII. MITIGATION OF IMPACTS TO HABITAT

During 2021, CEHMM received a total of 52 notices of new surface disturbances from industry, with 356.60 acres of new surface disturbances documented. All of these disturbances took place in Management Zone D. SLO received a total of 29 notifications of new surface disturbances from Participants, totaling 115.07 acres of disturbance. All of these disturbances also took place in Management Zone D. CEHMM worked with the Participants to ensure all of the proper conservation measures were followed including Reasonable and Prudent Practices for Stabilization (RAPPS) and Spill Prevention Control and Countermeasure (SPCC). These practices included building water-bars, silt fences, culverts, erosion blankets, waddles, and reseeding.

For all CCA/As, more than half of the acres of new surface disturbances occurred through well pad development.

Table 3. New Surface Disturbances in 2021.

	Well Pads	ROWs	Other Infrastructure	Total
CEHMM				
Notifications of New Surface Disturbances	22 (42.31%)	26 (50%)	4 (7.69%)	52
Acres Disturbed	226.59 (63.55%)	118.77 (33.31%)	11.19 (3.14%)	356.6
SLO				
Notifications of New Surface Disturbances	9 (31.0%)	16 (55.2%)	4 (13.8%)	29
Acres Disturbed	48.46 (42.1%)	37.021 (32.2%)	29.587 (25.7%)	115.07
COMBINED				
Notifications of New Surface Disturbances	31 (38.27%)	42 (51.85%)	8 (9.87%)	81
Acres Disturbed	275.05 (58.32%)	155.80 (33.04%)	40.77 (8.64%)	471.62

Habitat Conservation Fees

The CCA/A's contain a provision that all Habitat Conservation Fees will be adjusted once yearly by CEHMM for inflation or deflation. This adjustment is based on the percent increase or decrease in the most recent year's Consumer Price Index (CPI) published by the US Department of Labor, Bureau of Labor Statistics. When adjusting Habitat Conservation Fees, CEHMM refers to the annual inflation of CPI for All Urban consumers, U.S. City Average, all items less food and energy, not seasonally adjusted. Adjustments of the CPI shall occur on the January release date of the CPI for all items less food and energy. The all items less food and energy index rose 5.5 percent in 2021. Details on how the adjustment is calculated can be found in Appendix E of the Texas hornshell CCA/A's. Appendix A of this annual report shows the updated fees based on the January 2022 release

of the CPI. These fees are the same for the THM CCA/A and SLO CCAA.

IIX. COMPLIANCE MONITORING

The CCA/As require CEHMM and SLO to submit an annual compliance verification to the Service for each enrolled Participant. CEHMM performed the compliance monitoring for all of the CCA/As. In 2021, CEHMM's CCA/A compliance monitoring included inspecting for failure to submit new surface disturbances and inspecting for SPCC or RAPPS compliance if applicable. CEHMM utilized the New Mexico Oil Conservation Division (NMOCD) data, Bureau of Land Management (BLM) right-of-way data, and field surveying to conduct inspections. The programs compliance monitoring was completed for 2021.

IX. GRANTS

Both the Rio Grande Cooter Research and Sensor Array Study proposals have been submitted to NFWF, although neither has been funded as of yet. A NFWF funding decision is expected in March of 2022. These funding opportunities will require a matching contribution from the CCA/As if approved by NFWF. No CCA/A funds have been spent on these projects at this time. Both project proposals have been recommended by the Implementation Committee and approved by the Executive Committee should the proposals be approved by NFWF.

Rio Grande Cooter Research on Delaware River- CEHMM, the Service, NMDGF, and Eastern New Mexico University (ENMU) partnered on a proposal to survey for Rio Grande Cooter (*Pseudemys gorzugi*) in at least three unique localities on the Delaware River, with a high intensity trap effort that is comparable to the recent surveys on the Black River. The research proposed here leverages a productive collaborative team who will be examining the river to understand the current occurrence and population composition at one of the least surveyed sites of its assumed distribution. The product of the proposed work will provide much needed information on species distribution and habitat preferences, which are an essential part of implementing sound management practices for species protection.

Sensor Array Study- CEHMM proposed a project to establish a sensor array within the occupied reach of the Black River in southeastern New Mexico. The water quality data loggers will allow CEHMM to monitor and better understand the water quality conditions endured by the endangered THM. Through the establishment of the proposed sensor arrays, we will be able to further monitor and gain data to determine if, when, and for what period of time THM are enduring intolerable environmental conditions. The results of this data collection are expected to provide key insights to environmental gradients among microhabitats, especially as we prepare for further climate-driven variation.

CEHMM/SLO Instream Flow Program Initiative for the Texas Hornshell Mussel- In 2020, CEHMM and SLO partnered on a proposal from CEHMM to NFWF for a $250,000.00 grant to fund the development of an instream flow program to protect the endangered Texas hornshell mussel and other at-risk species in the Black and Delaware rivers. The NFWF awarded the grant in 2021 for $250,000.00. This funding requires an in-kind matching contribution from the CCA/A program, and in 2021, the Executive Committee set aside $250,000.00 in 2021 for the match. Some or all of the match can be provided through in-kind contributions from SLO and CEHMM, but the set-aside amount ensures the matching fund requirement is met. The Executive Committee also approved issuance of a contract with a consulting firm that specializes in the development of market-based

instream flow programs. The consultant will facilitate a Technical Working Group and assist with development of the pilot instream flow program. Work on this project will begin in earnest in the first quarter of 2022.

The overall objective of the initiative is to provide instream flow for the Texas hornshell in the Black and Delaware rivers. This may be achieved through the purchase or lease of water rights, or through alternative mechanisms such as forbearance agreements or strategies that make water available for instream flow during otherwise dry periods or when high flows are needed for life history requirements. The first expected outcome of the grant would be the execution of one or more short-term (3-5 year) agreements. At a minimum, these agreements will facilitate sufficient flow in the Black River to prevent the existing Texas hornshell population from being extirpated by lack of water. In the meantime, long-term solutions will be developed. The second expected outcome of the project will be the development of a framework for a long-term plan and budget for maintaining stream flows in the Black and Delaware rivers. The framework will include multiple options such as outright purchase of water rights, long-term forbearance agreements, or other mechanisms to reduce diversion from the rivers.

X. FUNDED OR COMPLETED PROJECTS

Enrollees, universities, government agencies, and others may submit project proposals to the implementation committee for funding consideration. CEHMM personnel work closely with enrollees to develop project proposals. The implementation committee, which prioritizes each proposal using evaluation criteria developed by the team (Appendix B), includes biologists from CEHMM, the FWS, the BLM, SLO, Texas Parks and Wildlife Department (TPWD), and the NMDGF. The implementation committee meets quarterly, via phone or in person, and votes on proposed projects as they are received. A full list of projects funded by the CCA/As can be found in (Table 4) and ongoing or completed projects can be found in Appendixes C - I.

* Indicates project is complete

Table 4. CCA/A Projects

Project	Date Funded	Completion Date	Amt Funded	Units	Description
*DM Erosion Control	9/19/19	8/21/19	$4,771.99	1 Acre	Installed silt fencing and filter sock to prevent erosion and sediment loading into Zone A of the Black River. This project was funded using CCAA funds.
*Black River Salt Cedar Spraying	9/19/19	12/5/20	$12,000.00	46 Acres	Hand Treatment of salt cedar on the Black River from John D forehand downriver. Hand treatment of salt cedar to allow native flora the opportunity to become reestablished. This project was completed by Carlsbad Soil and Water Conservation District.
River Flow Regime Requirements Study	9/19/20 amended 12/19/20	In-progress	$358,005.00	Black River	This project is both a research and technical assistance project. The research involves determining streamflow and in situ conditions necessary for the Texas hornshell to survive and thrive in the Black River by examining lethal and sub lethal thermal, hypoxia, and salinity thresholds and by collecting and assessing in-stream water-quality conditions.
*Black River (Rio Grande River Cooter Study)	12/19/22	12/31/21	$75,000.00	Riparian Area of Black River	CEHMM and ENMU are specifically seeking to: (1) identify nesting grounds at various stretches of the Black River, (2) confirm the peak of the nesting season, (3) understand the daily nesting activity (i.e., diurnal vs. nocturnal nesting behavior), (4) characterize nesting substrate, (5) identify nest distance from the water's edge, and (6) quantify nest success and nest predation.
*Black River Wetlands Action Plan	3/24/20	9/15/21	$4,669.81	Black River Watershed	Wetland Action Plans (WAP's) are designed to specifically address wetlands and riparian resources within the boundary of the Black River Watershed. Goals of the Wetland action plan are assess wetlands/riparian resources in their watershed and develop ways they propose to protect, restore, and create wetlands locally.
*Flume Draw Erosion Control	8/12/20	2/12/222	$2,912.18	3 Acres	CEHMM installed 16 erosion control fences at the headwaters of Flume Draw. Project area will take place at the head waters of flume draw in its entirety will positively affect the whole drainage.

Project	Date Funded	Completion Date	Amt Funded	Units	Description
Environmental DNA Assay Development	8/12/20	In-progress	$22,480.00	eDNA microsatellite	This project is to develop environmental DNA (eDNA) assays for Texas hornshell, Gray Redhorse, and Blue Sucker, and to complete preliminary eDNA-based surveys for these species.
Davis Riparian Restoration	8/12/20		$4,194.91	10 Acres of Vegetation Restoration	Planting native trees and shrubs to help support bank stabilization and restore riparian function back to the habitat. The project area will encompass approximately 13 acres along the banks of the Black River.
*Beard Black River Erosion Control	August 12th, 2020	6/24/21	$5,291.00	3 to 5 Acres	CEHMM installed 18 Erosion control structures to span areas with highest erosion due to bare soils, small indentations where water can speed up, and areas with erosion already occurring.
Bounds Riparian Restoration	8/12/20		$6,241.00	13 Acres of Vegetation Restoration	Planting native trees and shrubs to help support bank stabilization and restore riparian function back to the habitat. The project area will encompass approximately 13 acres along the banks of the Black River.
*USGS Stream Flow Gage's	September 1st, 2020	8/31/21	$77,005.00	2 USGS Gage's in Black River	Operation, Maintenance and calibration of two USGS stream flow gages in the Black River.
Instream Flow Program	June 1, 2021 to May 31st, 2024,	In-progress	$250,000.00	Provide optimal flow and habitat for Covered species	Our long-term objective is to provide instream flow for the Texas hornshell in the Black and Delaware Rivers through purchase or lease of water rights, or through alternative mechanisms such as forbearance agreements in the Black and Delaware Rivers, to dedicate to instream flow for the THM.
USGS Stream Flow Gage's	September 1st, 2021	In-progress	$77,005.00	2 USGS Gage's in Black River	Operation, Maintenance and calibration of two USGS stream flow gages in the Black River.

XI. CONSERVATION MEASURE VIOLATIONS

As the administrators of the CCA/A, CEHMM and SLO have the responsibility to provide formal notification to Participants if it is discovered that any of the conservation measures listed in their CIs and CPs are not being implemented. A Conservation Measure Violation (CMV) is a formal notification to Participants of the failure to

implement conservation measure(s). It is similar to an Incident of Non-Compliance (INC) that the BLM issues to operators that do not meet the conditions of use on their respective operations. If a CMV is issued, CEHMM and SLO will work with Participants to remedy the violation in relation to the specific conservation measure that is not being applied. No fine or penalty is involved with a CMV; however, if three CMVs are issued in a 12-month period, Participants risk termination of their CPs and/or CIs. Due to diligent planning, consultation with CEHMM and SLO, and an understanding of the purpose of the CCA/A, no CMVs were issued in 2021.

XII. SIGNATURE

If you have any questions, please call Matt Ramey at (575)-885-3700.

Signed: Emily K Wirth

Emily K. Wirth
Executive Director

Date: 3/2/2022

APPENDIX A - HABITAT CONSERVATION FEES FOR THE CALENDAR YEAR 2022

CCA/A Appendix E
Fee Structure – Revised for Inflation on 2/1/2022

The Participant may be responsible for paying an Enrollment Fee for the first three years this CCA and CP are in effect. If the Participant opts out of the CCA, the Participant is still responsible for these fees. The Participant shall pay the $30,000.00 Enrollment Fee for enrollment of facilities existing within the Covered Area if enrolling by the All Activities method of enrollment. The Participant may choose to enroll via the Parcel-by-Parcel method. In this case, the Participant shall pay a minimum Enrollment Fee of $3,000.00 for up to 1,000 acres. For all acreage above 1,000 acres, the Participant shall pay $3/acre. For either method of enrollment, the Participant shall make the first payment of Enrollment Fees at the time of enrollment. The Participant shall pay the second and third on the first and second anniversaries of the CCA effective date. If the Participant so chooses, the Participant may pay all three Enrollment Fees at the time of enrollment. Enrollment Fees will not be required after the initial three-year period.

The Habitat Conservation Fee for New Surface Disturbance associated with oil and gas development activities will be calculated using the following scales. The scales also apply to third parties doing work for the Participant either on or off the Participant's Enrolled Lands, regardless of who constructs or operates the associated facilities. The Participant may prepay Habitat Conservation Fees at any time at their discretion. The Participant must notify CEHMM prior to conducting any surface disturbing activities associated with this CP on or off the Enrolled Lands either by the Participant or third-party subcontractors. Management zone of the New Surface Disturbance is determined by the location of the activity being developed, not actual habitat found on site.

All Habitat Conservation Fees will be adjusted once yearly by CEHMM to account for inflation or deflation. The term "Base Habitat Conservation Fee" shall refer to the values of the Habitat Conservation Fees set forth in this Exhibit. For purposes of this section, the term "CPI-U" shall refer to the Consumer Price Index for All Urban Consumers, U.S. City Average, all items less food and energy (base 1982-84=100), not seasonally adjusted, as published by the U.S. Department of Labor, Bureau of Labor Statistics. The Maximum Annual Inflation Increase shall be based on the percent increase between the annual average CPI-U for the calendar year that precedes the date of the adjustment ("Current CPI-U") and the annual average CPI-U for calendar year 2016 ("Base CPI-U"). The Maximum Annual Inflation Increase shall be calculated as follows:

Maximum Annual Inflation Increase =

Base Habitat Conservation Fee x ((Current CPI-U – Base CPI-U) / Base CPI-U))

Increases, if any, shall occur on the January release date of the CPI-U. The Maximum Annual Inflation Increase will reflect the most recent revision to the annual average Current CPI-U, if any. CEHMM will send Participants a notification, both electronically and by mail, each year at the time the fees are adjusted.

If the annual average CPI-U is unavailable for a calendar year, no increases will be made. If the CPI-U is discontinued entirely or unavailable for a period longer than two calendar years, CEHMM will consult with the Participant to select an appropriate alternative index.

1) New Well Location Fees[1]

Management Zone	Conservation Fee
Zone A	Not applicable
Zone B	$22,478.46/location
Zone C	$11,239.23/location
Zone D	$2,809.80/location

[1.] Includes a single well pad no larger than 3 acres, multi-well pad no larger than 5 acres, and associated access road not to exceed 1 acre. Anything larger will be considered New Surface Development Fees described below. If any portion of the project falls into a higher management zone, the charge incurred will be that of the higher management zone.

2) New Surface Development Fees

For other New Surface Disturbances associated with Enrolled Lands, but not directly attributable to a new well pad[2] and associated road, including but not limited to pipelines, frac ponds, electric lines, pits, etc. the Habitat Conservation Fee will be based on the following scale:

Management Zone	Conservation Fee[3]
Zone A	Not applicable
Zone B	$8,429.42/acre
Zone C	$2,809.80/acre
Zone D	$1,123.92/acre

[2.] Co-located wells that require an increase in the size of the existing pad will be assessed by new acres disturbed.

[3.] These Conservation Fees are based on the following figures. No additional amounts are owed beyond the amount of the Conservation Fees:

Lease of Water Rights……10 acre feet = $5,000-$10,000
Purchase of Water Rights……1 acre foot = $5,500-$10,000
Habitat Restoration (i.e., salt cedar treatment) ……4 acres = $10,000
Caliche Removal……..2-3 acres = $10,000
Reseeding……1 acre = $1,000
Rebuilding Water Crossings……Undeterminable at this time

Note: All acreage calculations will be rounded up to the next whole acre, if over 0.5 acres.

New operations on previously disturbed land (e.g., co-located new well on an existing pad or new pipeline in an existing corridor, etc.) will incur no additional Habitat Conservation Fee, unless the area to be redisturbed has been reseeded and/or reclaimed as part of reclamation. Fees will also be assessed for any new acreage disturbed.

CEHMM will calculate area of New Surface Disturbances based on information received and/or on-the-ground observation. Should the Participant disagree with CEHMM's calculation of the area of New Surface Disturbance, the Participant has the right to challenge the estimate, provide supporting data, and meet with CEHMM and/or

the FWS, if necessary. CEHMM and FWS, if participating, will have the responsibility for the final determination of the area of New Surface Disturbance.

The Habitat Conservation Fee for above-ground power lines will be calculated using the above scale for New Surface Development. The acreage of New Surface Disturbance will be based on information found in the OCD and SLO New Surface Disturbance activities approval document provided by the Participant to CEHMM.

If New Surface Disturbance falls within two or more management zones, the amount of the Habitat Conservation Fee will reflect the amount of the New Surface Disturbance within each management zone.

3) Fees associated with new seismic data acquisition

Management Zone	3D Survey Conservation Fee	2D Survey Conservation Fee
Zone A	$11.25/acre	$224.78/linear mile*
Zone B	$8.43/acre	$168.59/linear mile*
Zone C	$5.62/acre	$112.39/linear mile*
Zone D	$1.69/acre	$28.11/linear mile*

*or any fraction thereof

The acquisition of seismic data on enrolled parcels may also disturb the surface of other land not enrolled in this CP. The Habitat Conservation Fee calculated for seismic activity includes disturbances occurring on both enrolled and non-enrolled land.

Routine production operations

Routine production operations are not considered New Surface Disturbance and will not create the obligations to pay a Habitat Conservation Fee. Routine production operations are those which do not require an agency permit or approval, and those operations that require an agency approval but do not disturb the surface.

APPENDIX B – PROJECT EVELAUATION CRITERIA

Research & Monitoring Evaluation Criteria				
Participants Name:				
Project Name:		Ranking Criteria		
Evaluator Name:		Points (1 - 10)	Weighting	Total
30%	Does the proposal benefit the Texas Hornshell Mussel?		7.0%	0
	Does the proposal benefit the Other Covered Species?		7.0%	0
	Is the proposed work a component of an overall research and monitoring plan or objective?		10.0%	0
11%	Which management zone does this project apply too?(Zone A,B, C, or D) Zone A - 10 Points, Zone B - 8 Points, Zone C - 5 Points, Zone D - 2 Points		7.0%	0
	Are Texas Hornshell or other Covered Species surveys needed.		2.0%	0
	Does the proposal provide a map showing the area of work in relation to known locations of Texas Hornshell and the other Covered Species?		1.0%	0
31%	Will the proposed work provide vital information required for the Texas Hornshell and other Covered Species		8.0%	0
	Will the proposed work provide information about multiple parameters needed for the development of a flow regime?		10.0%	0
	Does the proposed work focus on addressing gaps in existing scientific knowledge?		8.0%	0
	Does the proposal define a clear product or outcome?		5.0%	0
	Does the proposal meet all of the proposal guidelines?		7.0%	0
23%	Does the proposal include a timeline in which the work will be completed?		3.0%	0
	Does the proposal include a detailed budget?		5.0%	0
	Is there a Private, Federal or State cost share or match?		3.0%	0
	Does the proposal include partnership or coordination with government agencies or NGO's? (E.g. non-profit, international originations, etc.)		7.0%	0
	What is the likelihood of project completion within the proposed timeframe and budget?		5.0%	0
5%	Does the qualifications of the team meet the needed qualifications to complete the proposed work?		5.0%	0
100%	Total:	0	100.0%	0
Does this project warrant funding? Yes or No. Explain.				
Explain projects benefit torwards The Net Conservation Gain-				

Scoring Legend:	
10	Fully Accomplished
7	Mostly Accomplished
3	Partially Accomplished
0	Not Usable

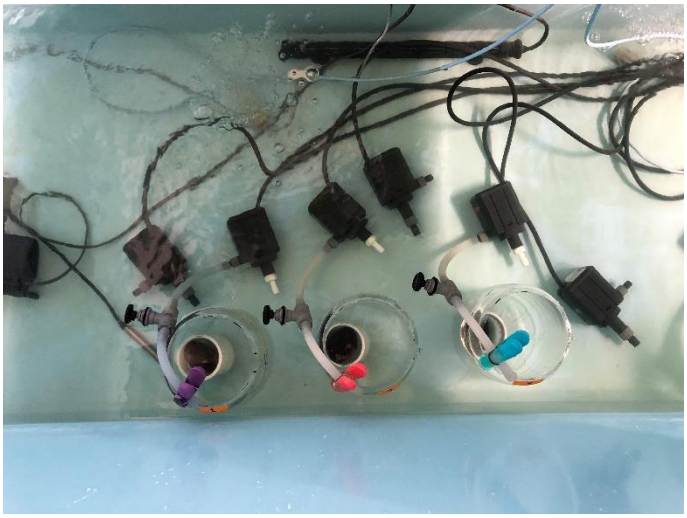
Habitat Restoration Evaluation Criteria				
Participants Name:				
Project Name:		Ranking Criteria		
Evaluator Name:		Points (1 - 10)	Weighting	Total
15%	Does the proposal benefit the Texas Hornshell Mussel?		5.0%	0
	Does the proposal benefit the Other Covered Species?		5.0%	0
	Which management zone does this project apply too?(Zone A,B, C, or D) Zone A - 10 Points, Zone B - 8 Points, Zone C - 5 Points, Zone D - 2 Points		5.0%	0
15%	Are Texas Hornshell or other Covered Species surveys included in the project plans?		2.0%	0
	Does the proposal provide a map showing the area of work in relation to known locations of Texas Hornshell and the other Covered Species?		4.0%	0
	Is the project a componet of an overall Habitat restoration project		6.0%	0
	Number of years' project will be maintanied and or monitored (1 point/year 10 points max)		3.0%	0
52%	Will the project reduce threats or potetial impacts to the Texas Hornshell or other Covered Species?		7.0%	0
	Will the projet remove nonnative brush or vegatation to increase benificial plant species?		5.0%	0
	Will the project remove infrastructure or debris from management zones A, B or C?		5.0%	0
	Does the project improve water quality or water quanitiy?		5.0%	0
	Will the project reduce habitat fragementation?		5.0%	0
	Will the project reduce sedimnet loading into the river?		5.0%	0
	Will the project reduce the threat of spills, leaks, or dumping into the river		5.0%	0
	Will the project take place on more than one enrolled participants land		5.0%	0
	Does the proposal define a clear product or outcome?		5.0%	0
	Does the proposal meet all of the proposal guidelines?		5.0%	0
13%	Does the proposal include a timeline in which the work will be completed?		3.0%	0
	Does the proposal include a detailed budget?		3.0%	0
	Is there a Private, Federal or State cost share or match?		3.0%	0
	Does the proposal include partnership or coordination with government agencies, NGO's, or other enrollees? (E.g. non-profit, international originations, etc.)		3.0%	0
	What is the likelihood of project completion within the proposed timeframe and budget?		1.0%	0
5%	Does the qualifications of the team meet the needed qualifications to complete the proposed work?		5.0%	0
100%	Total:	0	100.0%	0
Does this project warrant funding? Yes or No. Explain.				
Explain projects benefit torwards The Net Conservation Gain-				

Scoring Legend:	
10	Fully Accomplished
7	Mostly Accomplished
3	Partially Accomplished
0	Not Usable

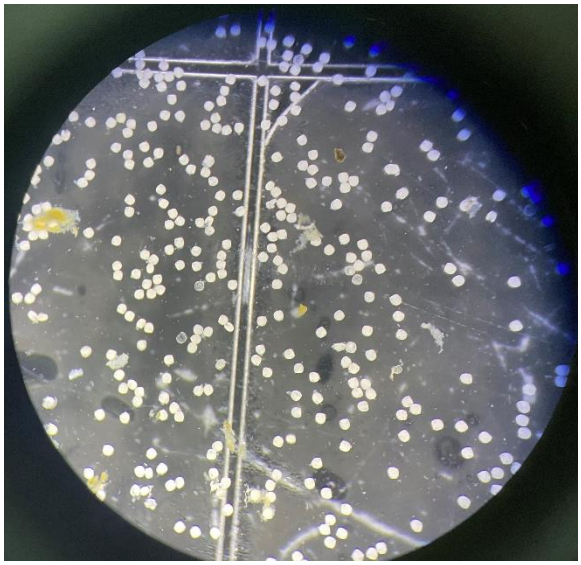
APPENDIX C - RIVER FLOW REGIME REQUIREMENTS STUDY

This project is currently ongoing and is currently in year two out of four. The expected completion date of the project is August 2023. This study was approved and funded in October of 2020 for $358,005.00. A collaborative team of researchers from Miami, Texas A&M, and Auburn Universities will conduct a series of laboratory experiments and field monitoring studies to examine lethal and sublethal effects of thermal and hypoxia stress on various life history stages of the Texas hornshell. Relationships between flow, temperature, and dissolved oxygen in the Black River will also be studied. Results will be used to identify flow regimes most likely to induce mortality and/or thermal stress in the Texas hornshell. Combined with historical datasets, results will be used by both CEHMM and the Service. CEHMM will determine whether frequency of stressful periods has been increasing over time, and the Service will make specific flow recommendations for Texas hornshell populations in the Black River.

Lab facility at TAMU University.



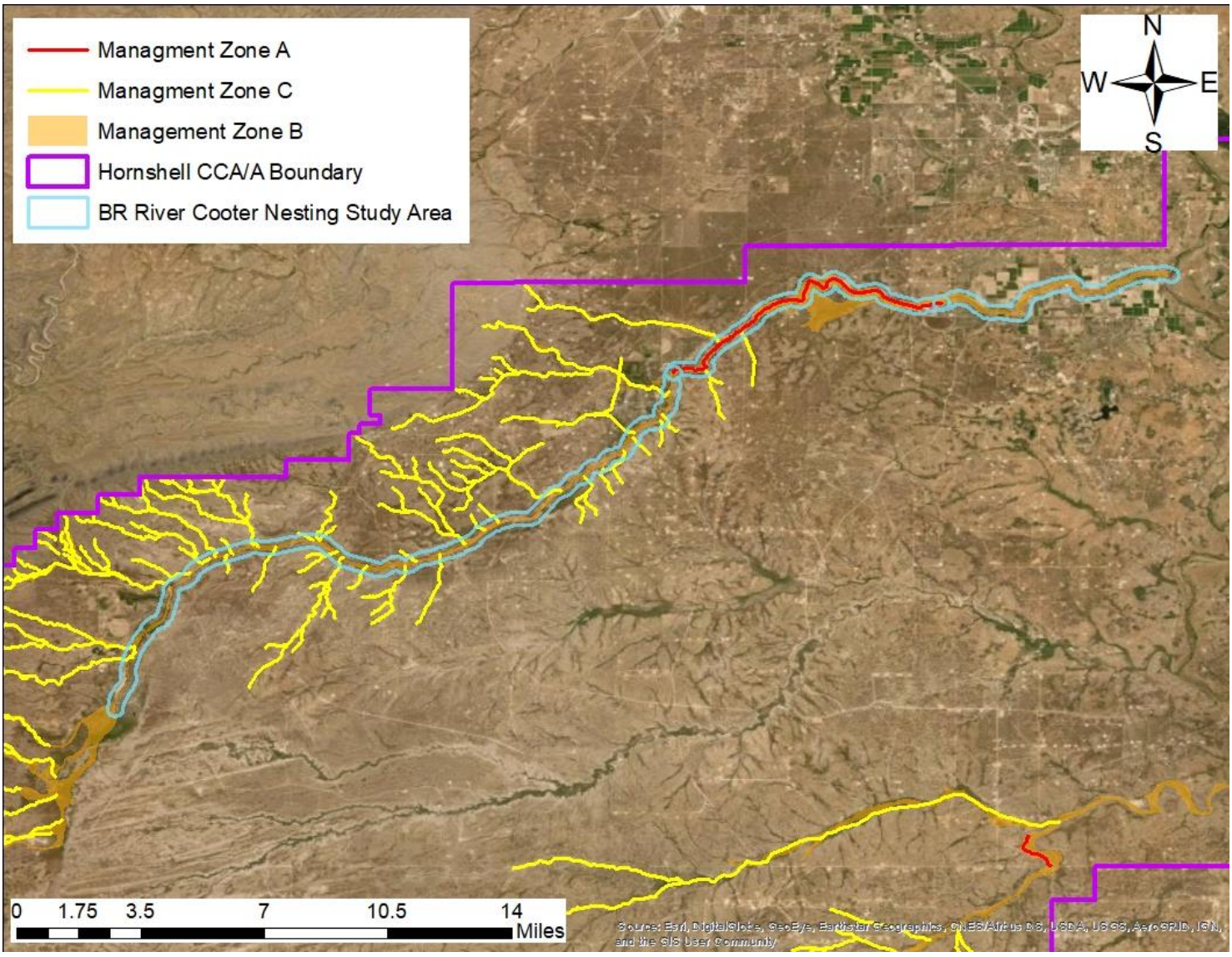
Auburn University research on THM.



Juvenile mussels under a microscope.

APPENDIX D - BLACK RIVER RIO GRANDE RIVER COOTER NESTING STUDY

This study was approved and funded in December of 2019 for $75,000, and was completed on December 31, 2021. A final report of the findings from this research project will published by ENMU on March 31, 2022. The Rio Grande river cooter is a covered species in the Texas Hornshell CCA/A. Little is known about Rio Grande river cooter ecology, especially pertaining to reproduction and nesting behaviors. Since no systematic searches for the nesting females or nests have been conducted on the Black River since the early 1990s, Dr. Mali with ENMU proposed several survey methods with a goal of assessing Rio Grande river cooter nesting biology. We specifically seek to: (1) identify nesting grounds at various stretches of the Black River, (2) confirm the peak of the nesting season, (3) understand the daily nesting activity (i.e., diurnal vs. nocturnal nesting behavior), (4) characterize nesting substrate, (5) identify nest distance from the water's edge, and (6) quantify nest success and nest predation.

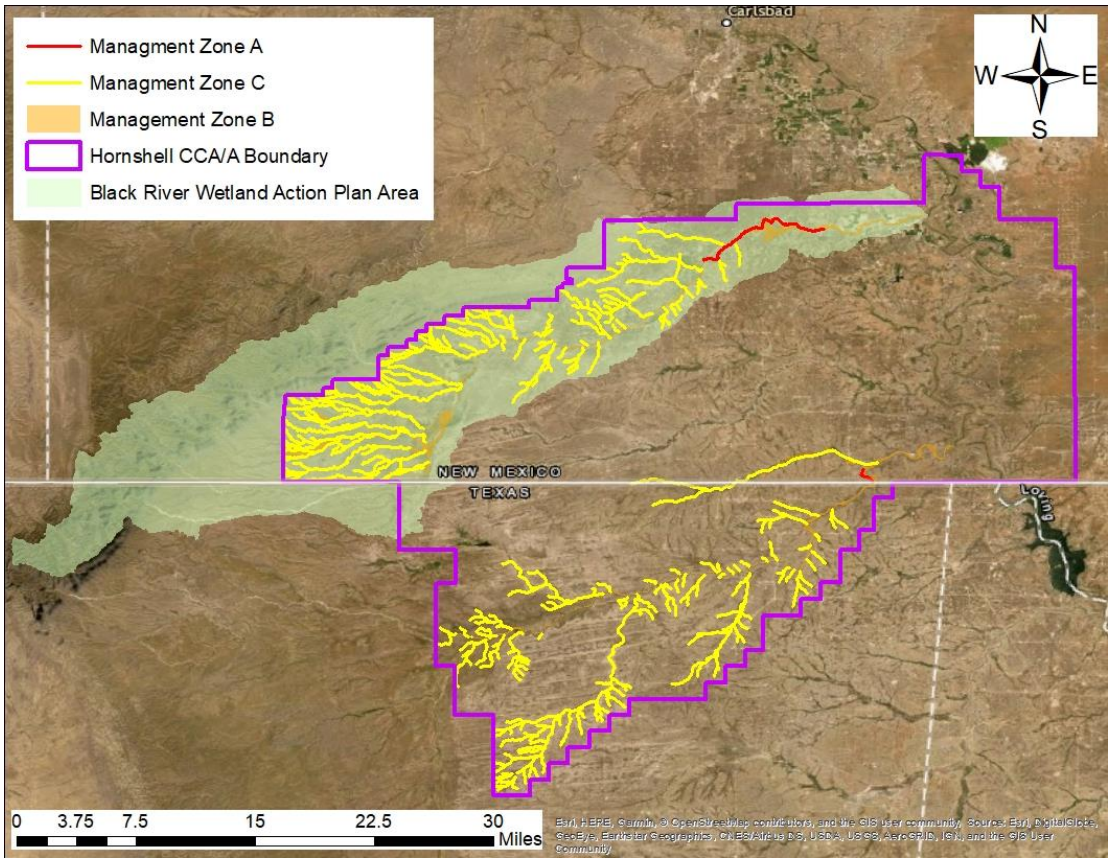


Map of project area for Rio Grande River Cooter research.

APPENDIX E - BLACK RIVER WETLAND ACTION PLAN

This project was completed and submitted on September 15, 2021. A final review of the Black River WAP is still in progress by NMED, but is expected to be completed by May 2022. In the fall of 2019, CEHMM submitted a proposal to the New Mexico Environment Department for the Black River Wetland Action Plan (WAP), and the contract was awarded in the spring of 2020. The THM CCA/A provided matching funds in the amount of $4,669.81. The New Mexico Wetlands Program facilitates the development of comprehensive wetlands restoration and protection in watersheds throughout New Mexico. The WAP is a planning document designed to address wetlands and riparian resources within the boundaries of the Black River watershed. A WAP describes the current status of wetlands/riparian types, distribution, and conditions within the watershed. It is recognized as a working document representing the best information available at the time. This plan also documents and provides information for improving wetland conditions, identifies sites that can be protected and/or restored, and determines where additional monitoring and inventory are needed.

The Black River near Cottonwood day use area.

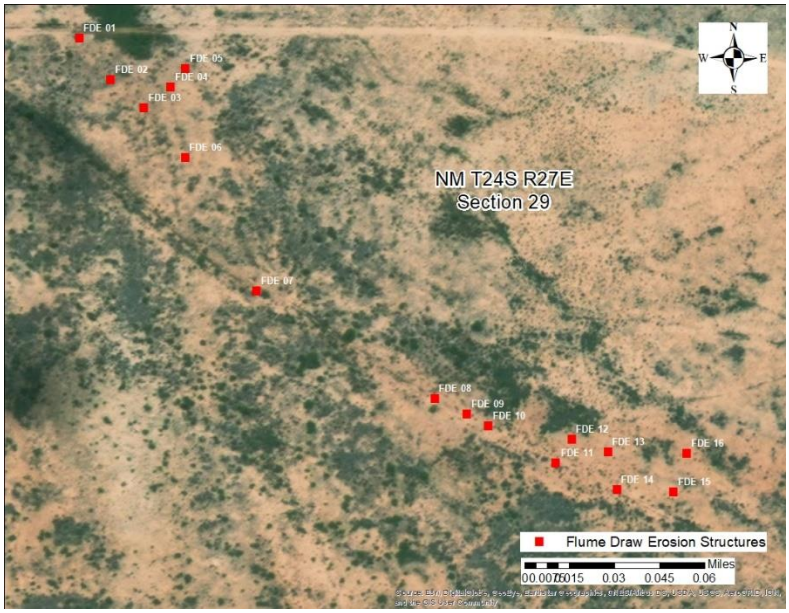


Black River WAP development area.

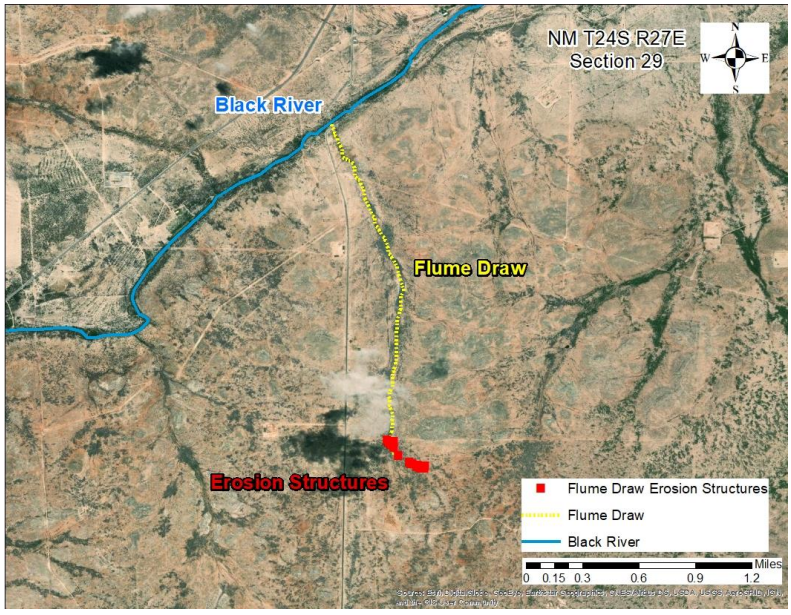
APPENDIX F - FLUME DRAW EROSION CONTROL PROJECT

Originally approved and funded on August 12, 2020 for $2,912.18, this erosion control project started on October 13, 2021 and was completed on February 12, 2022. Sixteen erosion control structures were installed at the head waters of Flume Draw. The structures will reduce sedimentation of the Black River and will promote vegetative growth in a highly eroded ephemeral drainage. V-fence was cut to a height of 36 inches and bent into an L-shape with the bottom 18 inches being buried. Natural woody substrate and rock was lined on the bottom of the fence to create a porous dam.

Series of erosion control structures installed in Flume draw.



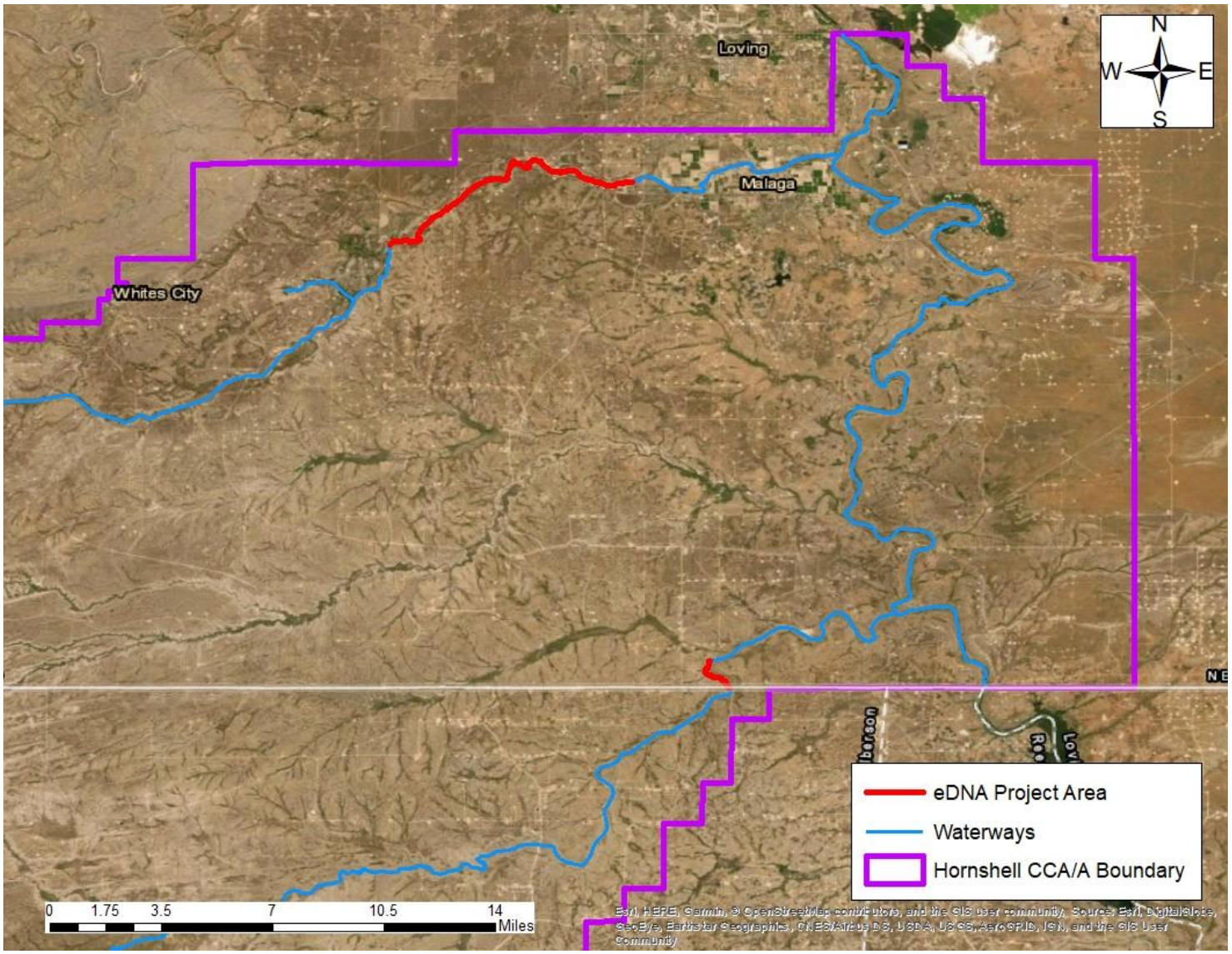
Map of erosion structures.



Project area for Flume draw.

APPENDIX G - ENVIRONMENTAL DNA (eDNA) ASSAY DEVELOPMENT FOR TEXAS HORNSHELL AND HOST FISHES

Originally approved and funded on August 12, 2020 for $22,480, this eDNA research project began in January 2022 and is expected to be completed by January 2023. eDNA refers to DNA that can be extracted from environmental samples, such as water. The goal of this project is to develop an eDNA assay for the Texas hornshell (*Popenaias popeii*), gray redhorse (*Moxostoma congestum*), and blue sucker (*Cycleptus elongatus*). This project will provide an additional tool for determining the presence, absence, and distribution of the target species. Using eDNA techniques to evaluate distribution of these Covered Species will be more efficient than traditional survey methods. Contracts have been developed and work on this project is expected to be completed in January 2023.

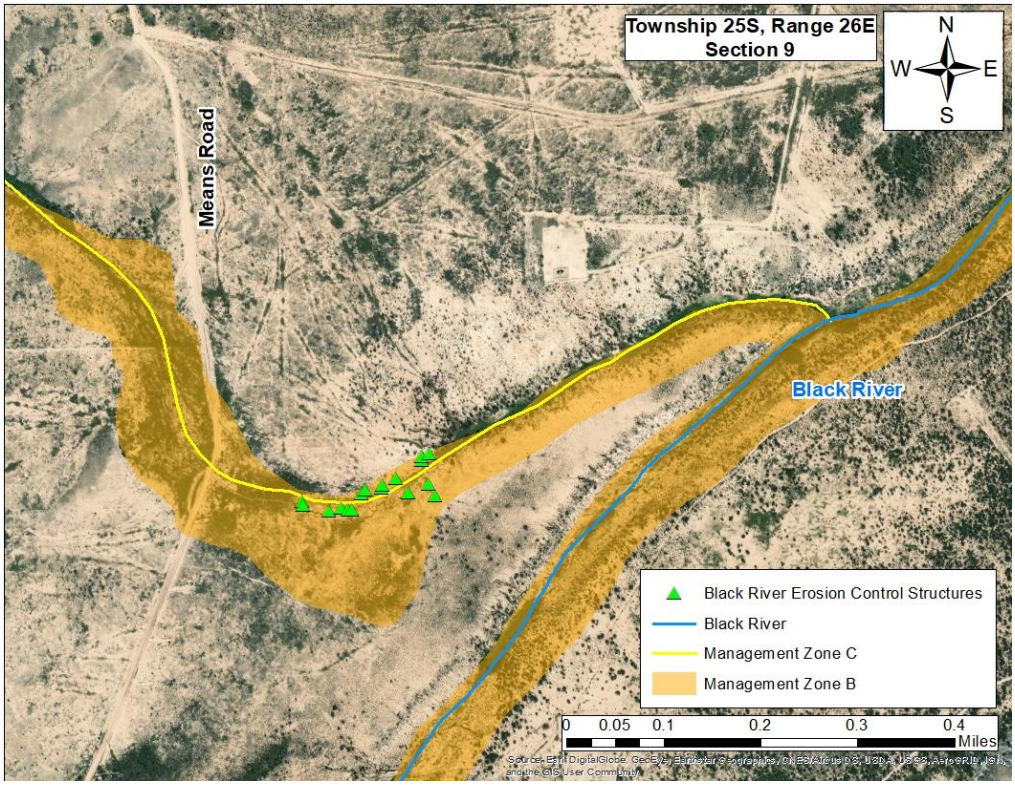


Research area for eDNA study.

APPENDIX H - BEARD BLACK RIVER EROSION CONTROL PROJECT

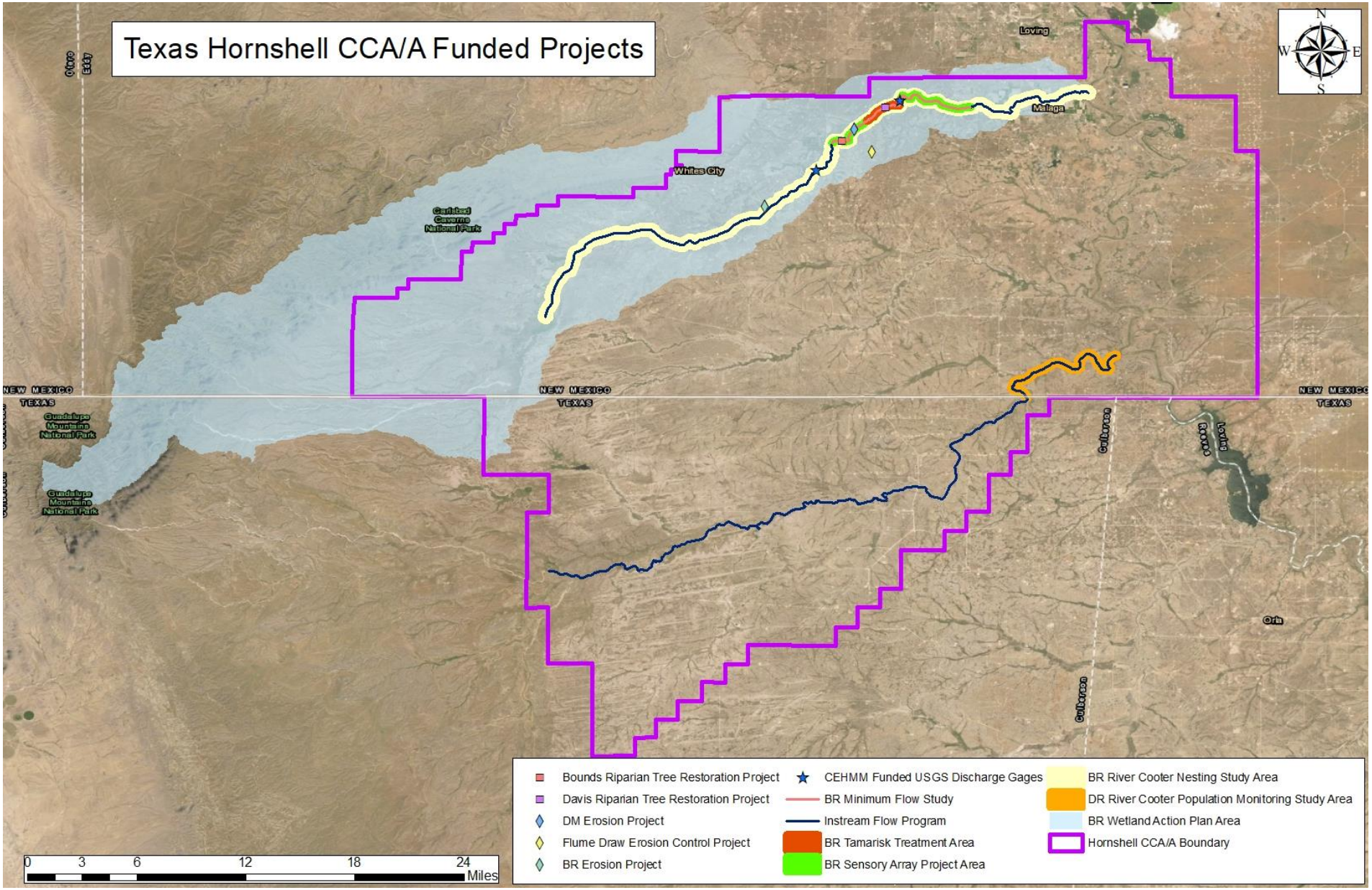
Originally approved and funded on August 12, 2020 for $5,291, this erosion control project was completed on June 24, 2021. Eighteen erosion control structures were installed in a drainage that has the highest amount of erosion. The structures will reduce sedimentation of the Black River and will promote vegetative growth in a highly eroded ephemeral drainage. V-fence was cut to a width of 36 inches and bent into an L-shape with the bottom 18 inches being buried. Natural woody substrate and rock was lined on the bottom of the fence to create a porous dam.

Before and after.



Project area for riparian restoration.

APPENDIX I – FUNDED PROJECTS



Complete map of all projects funded by the CCA/A program.